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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/090,151	03/05/2002	Shigeto Taga	36856.621	1870

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EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/090,151

Applicant(s)

TAGA, SHIGETO

Examiner

Thomas M. Dougherty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-14 and 17 is/are rejected.
- 7) ☒ Claim(s) 9, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 803.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (US 5,969,461) in view of Katsunori et al. (JP 2000196407 A).

Anderson et al. show (fig. 1) a surface acoustic wave device comprising: a surface acoustic wave element (10) including a piezoelectric substrate having interdigital electrodes (col. 2, ll. 27-35) and electrode pads (20) and from the respective interdigital electrodes; an electronic component package (16) supporting the surface acoustic wave element (10), the electronic component package (16) including electrode patterns (18), arranged to input and output electrical signals; and metal bump connections (24, he notes that these are of a conductive material, ergo, metallic in composition) electrically connecting electrode pads (20) to the respective electrode pattern sections (18); wherein the electrode pads (20) include aluminum as a major component and copper as a minor component, the copper content being at least about 3.5 percent by weight.

Note the discussion at col. 2, lines 56-61 in which it is noted that the pads are a "metal or alloy containing at least one of gold, **aluminum, and copper** ...". The metal bump connections (24) include a metal bump disposed between each of the electrode pads

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(20) and the corresponding electrode pattern section (18) on the electronic component package (16). The metal bump includes a semispherical main portion (albeit concave) and a substantially perpendicular projection. As surface acoustic wave devices are typically used in communications' apparatus, and as the intended use does not further limit the structural features of the invention, this recitation carries no patentable weight. As noted by the Applicants' in their remarks, Anderson is not specific as to copper content.

Katsunori et al. note an "Al-Cu alloy thin film with a copper content of 1.5 atom %" is found in line 4 of paragraph N0. [0058], which converted to mass, amounts to 3.5 mass % (based on the atomic weight of Al and Cu, 27.0 and 63.5 respectively).

Katsunori et al. further show an interdigital electrode structure (e.g. fig. 3), electrode pads (20 in fig. 7). Specific electrode patterns on the electronic component package are not explicitly shown.

It would have been obvious to one having ordinary skill in the art to use the Al-Cu of Katsunori in the device of Anderson et al. at the time that invention was made in order to "improve the service life of power resistance by making the heat conductivity of a highly heat conductive member higher than that of a piezoelectric substrate, on which the highly heat conductive member is provided, and surface acoustic wave (SAW) connecting surface constitutive material of a package and transmitting heat, which is generated by an interdigital type transformer (IDT), through the highly heat conductive member to the outside" as the Abstract notes.

Claims 2, 6-8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson (US 5,969,461) in view of Katsunori et al. (JP-2000196407 A). Given the combined invention as noted above, Anderson doesn't disclose gold bump connections or an alloy of gold for such or note use of gold for his electrode pattern sections. He doesn't provide a specific range for the alloy content of his electrode pads. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use gold or an alloy of gold for the bump connections in Anderson's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. It would have been obvious to one of ordinary skill in the art to so choose the ranges for the copper content in the electrode pads which are delineated by the Applicants in their claims since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105, USPQ 233.

Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson (US 5,969,461) and Katsunori et al. (JP-2000196407 A) in view of Tsuji et al. (US 5,699,027). Given the invention of Anderson et al. and Katsunori et al. as noted above, they further show the electrode pattern sections (18) as being provided on an inner surface of the bottom plate (16). They further show a plurality of external connection terminals (not numbered) on an outer surface of the bottom plate (16) of the electronic component package. The surface acoustic wave element (10) is mounted

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face down in the electronic component package such that the interdigital electrodes face the bottom plate (16) of the electronic component package. The surface acoustic wave element (10) is spaced from the bottom plate of the electronic component by a gap.

They do not show his electronic component package including a bottom plate, a sidewall component, a cover and a cavity, the cavity accommodating the surface acoustic wave element therein and being surrounded by the bottom plate, the sidewall component and the cover. They do not explicitly show the outside terminals as being electrically connected to respective electrode pattern sections.

Tsuji shows show (fig. 1) a surface acoustic wave device comprising: a surface acoustic wave element (14) having electrode pads (15) thereon, the electrode pads (15) being arranged to input and output electrical signals to and from the respective interdigital electrodes; an electronic component package supporting the surface acoustic wave element (14), the electronic component package including electrode patterns (4), arranged to input and output electrical signals; and metal bump connections (17) electrically connecting electrode pads (15) to the respective electrode pattern sections (4). Tsuji et al. further show their electronic component package including a bottom plate (1), a sidewall component (3), a cover (17) and a cavity, the cavity accommodating the surface acoustic wave element (14) therein and being surrounded by the bottom plate (1), the sidewall component (3) and the cover (17). They further show a plurality of external connection terminals (7) on an outer surface of the bottom plate (1) of the electronic component package, the outside terminals (7) are

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electrically connected to respective electrode pattern sections (4, 5). The surface acoustic wave element (14) is mounted face down in the electronic component package such that the interdigital electrodes face the bottom plate (1) of the electronic component package. The surface acoustic wave element (14) is spaced from the bottom plate of the electronic component by a gap.

Their electrode pads do not include aluminum as a major component and copper as a minor component, the copper content being at least about 3.5 percent by weight.

It would have been obvious to one having ordinary skill in the art to provide for a sidewall and lid components in the device of Anderson et al. and Katsunori et al., such as is shown by Tsuji et al., at the time their invention was made in order to protect the device from unintentional physical damage and further to provide for the ability to provide signals from outside the device to inside by providing for a connection between outside terminal electrodes to the electrode patterns inside the device, such as is shown by Tsuji et al..

Allowable Subject Matter

Claims 9, 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

tmd

November 8, 2002

